Touch Screen Interactive Simulations on Android Tablet Computers

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Tablet Computers

Tablet computers are emerging as powerful platforms for education and entertainment. They are rapidly becoming a major consumer device, with users increasingly choosing tablets over traditional computers. The performance of tablet computers makes them particularly well-suited for applications such as interactive simulations, which traditionally have been difficult to implement on mobile devices. This paper explores the use of tablet computers for interactive simulations, focusing on the Android platform.

Programming Android

The Android operating system has emerged as a powerful and popular platform for developing apps to run on a wide range of devices. This paper describes how the software engineering issues we encountered when developing Android apps differed from those encountered when developing desktop applications. It also discusses the unique characteristics of the Android platform that make it an interesting target for software development.

Discussion

The tablet devices we employed for this work allowed us to develop both a core processor and the Android operating system. This gave us the opportunity to manage the screen touch interface and the virtual keyboard simultaneously, allowing for a seamless user experience.

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References


Figures and Tables

Figure 1: Android tablet running interactive simulation model, showing direct manipulation rendered model, interactive widgets, and running plot of magnetization.

Figure 2: Touch event handling pseudo-code.

Figure 3: Four HCI interactions used in the simulation app: conventional widget interactions; three-finger pan and swipe; two-finger pinch-to-zoom; and single touch using a single-tap gesture to toggle.

Figure 4: Being tablet screenshots showing different field effects.

Figure 5: Model selection screen-shot showing typical model choices available with the graphical user interface software development kit.

Touch Screen HCI

There are a number of gestures possible with the touch screen. These can be used to control the simulations directly.

Touch Screen Interactions

Interactions such as pinch-to-zoom are used to manipulate the model, while drag-and-drop is used to select model elements. The user can also use their fingers to swipe across the screen to pan and zoom in and out.

Figure 3 shows the four HCI interactions used on our tablet simulation. They can be used in the conventional way or can be used to manipulate the model, such as when the user needs to zoom in on a specific area.

The model can be manipulated by directly interacting with the model with your fingers. The touch interface is designed to be intuitive and easy to use, allowing users to explore the model interactively.

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